Specification:

Page 1, in the background section, the second paragraph, replace with the following new paragraph:

--- The MIMO is a multiple-input-multiple-output as a wireless link and is also known as a space-time signal processing that a natural dimensional of transmitting data is complemented with a spatial dimension inherent in the use of multiple spatially distributed antennas. The MIMO is able to turn multipath ~~propagation~~ propagations into a benefit for service ~~provider~~ providers and wireless users. This is because signals on the transmit antennas at one-end and the receiver antennas at the other-end are integrated such that a quality of bit error rate (BER) or a data rate of the communication for each wireless user or a transmitting distance is improved, thereby increasing a communication network's quality of service.

Page 1, in the background section, the third paragraph (extends to page 2), replace with the following new paragraph:

--- The W-CDMA is a wideband, spread spectrum radio interface that uses CDMA technology to meet the needs for wireless communication systems, which allow subscribers to access World Wide Web or to perform file transfers over packet data connections capable of providing 144 kbps and 384 kbps for mobility, and 2 Mbps in an indoor environment. The W-CDMA (also known as CDMA2000) supports for a wide range of radio frequency (RF) channel bandwidths from 1.25 MHz to 15 MHz with operating of 1.90 GHz band, where the channel sizes of 1, 3, 6, 9, and ~~12 × 1.25~~ 15 MHz. The wide channels of the W-CDMA offer any combination of higher data rates, thereby ~~increase~~ increasing total capacity and/or ~~increase~~ increasing range. The W-CDMA also employs a single carrier and a multicarrier system, which can be deployed as an overlay over one or more existing the second generation of TIA/EIA-95B 1.25

MHz channels. In the multicarrier system, modulation symbols are de-multiplexed onto N separate 1.25 MHz carrier, where each carrier is spread with a 1.2288 ~~Mcps chip rate~~ mega-chip per second (Mcps).

Page 2, in the background section, the second paragraph (extends to page 3), replace with the following new paragraph:

--- The WLAN is an IEEE standard for a wireless LAN medium access control (MAC) and physical layer (PHY) specification and is also referred to as the high-speed physical layer (802.11a) in the 5 GHz band. The WLAN standard specifies a PHY entity for an orthogonal frequency division multiplexing (OFDM) system. The RF ~~LAN~~ lower noise amplifier (LAN) communication system is initially aimed for the lower band of the 5.15 – 5.35 GHz and the upper band of the 5.725 – 5.825 GHz unlicensed national information structure (U-NII) bands, as regulated in the United States by the code of Federal Regulations under Title 47 and Section 15.407. The WLAN communication system provides the data payload rate of 6, 9, 12, 18, 24, 36, 48 and 54 ~~Mbit/s~~ mega-bit per second (Mbps). Also, the WLAN communication system supports the transmitting and receiving at data rate of 6, 12, and 24 ~~Mbit/s~~ Mbps with mandatory. The WLAN communication system uses 52 subcarriers with modulation of using binary phase shift keying (BPSK) or quadrature phase shift keying (~~BPSK/~~QPSK), 16-quadrature amplitude modulation (QAM), or 64-QAM. The forward error correction (FEC) coding ~~(FEC)~~ of a convolution ~~encoding~~ encoder is used to perform ~~with~~ a coding rate of 1/2, 2/3, or 3/4.

Page 5, in the background section, the third paragraph (extends to page 6), replace with the following new paragraph:

--- The multimode and multiband MIMO transceiver of a

W-CDMA, WLAN and UWB communication system is disclosed herein according to some embodiments of the present invention. The invented transceiver system is a MIMO-based multimode and multiband portable station [[with]] of integrating [[of]] W-CDMA, WLAN, and UWB ~~communication~~ communications. The portable station employs four antennas at the transmitter and receiver as a MIMO link. During the wireless communications, the W-CDMA in the portable station has a multicarrier for 12 channels with a total of 15-MHz frequency bandwidth at the center of 1.9 GHz frequency band and is able to transmit the data rate more than 2 Mbps. The W-CDMA can be used as a user phone with enable of communicating speech, data, image, and clip video. On the other hand, during the fixed wireless communications, the WLAN in the portable station can transmit and receive the data rate up to 54 Mbps based on an OFDM technology at the unlicensed national information structure (U-NII) bands of the 5.15 – 5.35 GHz and the upper band of the 5.725 – 5.825 GHz. The UWB communication in the portable station uses an OFDM-based multicarrier for four-multiband with each multiband of frequency bandwidth about 512 MHz in the frequency range from 3.1 GHz to 5.15 GHz and is able to transmit the data rate at 1.5 Gbps. Since the UWB communication can transmit and receive a very-high data rate but with a very short-distance range while the WLAN is able to transmit and receive the lower data rate in a much longer distance range than the UWB communication. Thus, a combination of [[the]] W-CDMA, WLAN, and [[the]] UWB ~~communication~~ communications in a specific portable device is enable a user to have internet surf, to listen MP3 music, to watch DVD, to play video game, to view stock graph, to transmit data with other devices in a real-time operation. Therefore, a trade-off benefit of W-CDMA, WLAN, and UWB communications can be utilized each other, thereby having a co-existence of the multimode and multiband portable station with multiply applications in a multiply environment.

Page 6, in the background section, the second paragraph (extends to page 6), replace with the following new paragraph:

--- The present invention of the multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communications utilizes both benefits of a wireless phone and a fixed wireless broadband communication. Such a multimode device not only can transmit the packet data in a form of wireless phone environment but also can use as a very-high speed wireless broadband Internet device to transmit and receive data, image, video, video game, music, and stock graph in a real-time. Therefore, there is a continuing need of the multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication system for delivering a very-high data rate with ~~a capability of~~ flexibility and scalability <u>capabilities</u> in a combination form of wireless and fixed wireless ~~environment~~ environments.

Page 7, in the summary section, the second paragraph, replace with the following new paragraph:

--- In accordance with one aspect, a multimode and multiband MIMO transceiver of W-CDMA, WLAN and UWB communication comprises<u>:</u> ~~a MIMO-based multimode and multiband RF unit of W-CDMA, WLAN and UWB, a W-CDMA rake and baseband processor, a dual-mode WLAN and UWB OFDM processor, a tri-mode interleaver, a tri-mode coding processor, a sharing memory bank, a tri-mode control processor of W-CDMA, WLAN and UWB, and a multiple antenna unit including four identical antennas.~~ <u>(1) the MIMO-based multimode and multiband RF unit including W-CDMA, WLAN and UWB connected to a multiple antenna unit in which includes N antennas, where N is an integer and greater than 1; (2) the MIMO-based multimode and multiband RF unit connected to a WLAN and UWB OFDM processor in which coupled to a sharing memory bank, an interleaver, and a W-CDMA, WLAN, and</u>

UWB control processor coupled to a coding processor; (3) the MIMO-based multimode and multiband RF unit connected to a W-CDMA Rake and baseband processor in which coupled to the sharing memory bank, the interleaver, and the W-CDMA, WLAN, and UWB control processor; (4) the MIMO-based multimode and multiband RF unit connected to the sharing memory bank in which coupled to the WLAN and UWB OFDM processor, the W-CDMA Rake and baseband processor, and the W-CDMA, WLAN, and UWB control processor; (5) the MIMO-based multimode and multiband RF unit connected to the W-CDMA, WLAN, and UWB control processor in which coupled to the sharing memory bank, the W-CDMA Rake and baseband processor, the WLAN and UWB OFDM processor, the interleaver, and the coding processor; (6) the interleaver coupled to the W-CDMA, WLAN, and UWB control processor, the W-CDMA Rake and baseband processor, the WLAN and UWB OFDM processor, and the coding processor; and (7) the coding processor coupled to the interleaver and the W-CDMA, WLAN, and UWB control processor.

Page 13, in the receiver architecture section, the second paragraph (extends to page 14), replace with the following new paragraph:

--- Referring to FIG. 3 is a detailed block diagram 300 of showing the tri-mode A/D converter unit 290 according to some embodiments. There are two switch units of 310 and 320 and eight A/D converters of 330a to 330h, with a sampling frequency rate at 540 MHz. During W-CDMA mode, a switch 312 of a switch unit 310 and a switch 322 of a switch unit 320 connect to the input signals of g_1 and g_2, respectively. The outputs of the switch units of 310 and 320 are passed into two A/D converters of 330a and 330b, with the sampling ~~frequency~~ rate at 540 MHz. This is an over-sampling for the W-CDMA signals. Other A/D converters of 330c to 330h are rest. The output signals au_1 and au_2 of the A/D converters of 330a and

330b are used for the W-CDMA rake and baseband processor. During the WLAN mode, the switch 312 of the switch unit 310 and the switch 322 of the switch unit 320 connect to the input signals of w_1 and w_2, respectively. The outputs of the switch units of 310 and 320 are passed into two A/D converters of 330a and 330b, with the sampling ~~frequency~~ rate at 540 MHz. This is an over-sampling for the WLAN signals. Other A/D converters of 330c to 330h are rest. The output signals au_1 and au_2 of the A/D converters of 330a and 330b are used for the dual-mode WLAN/UWB baseband processor. During UWB mode, the switch 312 of the switch unit 310 and the switch 322 of the switch unit 320 connect to the input signals of u_1 and u_2, respectively. The outputs of the switch units of 310 and 320 along with other six input signals of u_3 to u_8 are in parallel passed into eight A/D converters of 330a and 330h, with the sampling ~~frequency~~ rate at 540 MHz. The output signals of au_1 to au_8 of the A/D converters of 330a to 330h are used for the dual-mode WLAN/UWB baseband processor.

Page 15, in the receiver architecture section, the second paragraph (extends to page 16), replace with the following new paragraph:

--- FIG. 5 is a detailed block diagram 500 of showing a dual-mode WLAN and UWB OFDM processor 140 according to some embodiments. During WLAN operation, the input signals of au_1 and au_2 are passed into a WLAN digital decimation channel select filter unit 510, [[in]] which produces desired digital downsampled signal sequence. By connecting a switch 532 to a position of [[*a*]] "*a*" in a switch unit 530, the output of the WLAN digital decimation channel select filter unit 510 is passed through a dual-mode WLAN and UWB, serial-to-parallel ~~(s/P)~~ (S/P) and guard removing unit 540 to produce 64 parallel signals for a dual-mode WLAN and UWB FFT and FEQ unit 542. The WLAN and UWB FFT and FEQ unit 542 performs 64-point FFT and FEQ operation followed by a parallel-

to-serial (P/S) [[P/S]] unit 546 to convert 64 parallel signals into a serial output signal. On the other hand, during UWB operation, the input signals from au_1 to au_8 are passed into a multiband UWB digital receiver filter despreading and TEQ unit 520 to produce 4 parallel signals. The first output signal s_1 connects to the dual-mode WLAN and UWB S/P and guard-removing unit 540 to produce 1024 parallel signals by connecting the switch 532 into a position [[*b*]] "*b*" in the switch unit 530. Then, the 1024 output signals of the dual-mode WLAN and UWB S/P and guard-removing unit 540 pass through the dual-mode WLAN and UWB FFT and FEQ unit 542 to produce 512 parallel signals for the P/S unit 546, which converts 512 parallel signals into a serial signal for a P/S unit 560. Other output signals of s_2 to s_4 from the multiband UWB digital receiver filter, despreading and TEQ unit 520 in parallel pass three S/P and guard removing units of 550b to 550d. Each of S/P and guard removing units of 550b to 550d produces 1024 parallel signals for FFT and FEQ units of 552b to 552d followed by P/S units of 554b to 554d to produce a serial signal. Then the P/S unit 560 converts the output signals of the P/S unit 546, and the P/S unit 554b-554d to produce one single output signal in which is despreaded with a sequence from a user key generator 580 by using a spreader 570.

Page 16, in the receiver architecture section, the second paragraph (extends to page 17), replace with the following new paragraph:

--- FIG. 6 is a detailed block diagram 600 of showing a dual-mode WLAN and UWB FFT and FEQ unit 542 according to some embodiments. This unit includes a 1024-point FFT 610, a WLAN/UWB mode 660, 500 equalizers $620a_1$ to $620a_{500}$, 500 decision detectors $630a_1$ to $630a_{500}$, 500 subtracts $640a_1$ to $640a_{500}$, and an adaptive algorithm 650. During WLAN mode, the 1024-point FFT 610 only performs 64-point FFT operation under controlling by the WLAN/UWB mode 660. The 64 equalizers $620a_1$

to $620a_{64}$, 64 decision detectors $630a_1$ to $630a_{64}$, and 64 subtracts $640a_1$ to $640a_{64}$ are used along with the adaptive algorithm 650 [[for]] to update the equalizer taps. Thus, the dual-mode WLAN and UWB FFT and FEQ unit 542 produces 64 parallel output signals. During UWB mode, the 1024-point FFT 610 has 1024 inputs and produces 512 outputs, [[in]] which are used for 500 equalizers $620a_1$ to $620a_{500}$, 500 decision detectors $630a_1$ to $630a_{500}$, and 500 subtracts $640a_1$ to $640a_{500}$. The adaptive algorithm 650 is used to adjust the equalizer taps. The adaptive algorithm is one type of algorithms including a least mean square (LMS), a recursive least squares (RLS) or a constant modulus algorithm (CMA). As a result, in this case, the dual-mode WLAN and UWB FFT and FEQ unit 542 produces 500 parallel output signals.